Group 2
Breakout Group Technical Discussion

Members

- *Group Lead: Sara McComb, UMASS*
- *Scribe: Patty Jones, NASA*
- *Members: Kathy Hess, Aptima; Mary Beth Garner; Nina Verma, Pax River; Cap Smith, Colorado State; David Noble, EBR; Bob Fleming, SPAWAR; Karen Garner, Pax River*
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Identify additional research gaps in *CKM* that need to be addressed for effective collaboration.

- *Speed and efficiency of information transfer*
- *Information filtering, categorization, rules for managing information*
- *Efficient and non-intrusive methods for knowledge elicitation*
- *Representing uncertainty of information*
- *Source channel reliability*
- *Expertise locator vs. anonymity*
- *Distinguishing between aspects of shared understanding: goals, values, "how the world works"*
- *Understanding the efficacy of different training and other inventions (e.g., when does cross-training really help)*

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Identify and discuss new approaches on how to empirically answer each research gap (e.g., gap = metrics to measure team shared understanding; approach = new communication protocol analysis techniques).

- *Taxonomy for categorizing tasks and teams (analogy: Periodic table)*
- *Identifying differences between consensus attainment and conflict resolution (to what extent are processes the same)*
- *Collaboration vs coordination vs cooperation (e.g., Malone: coordination is management of interdepencies, collaboration is shared goal)*
- *Identification and management of "boundary objects"*
- *Issue: Access to standing groups for longitudinal studies*

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Identify and discuss where current CKM projects could work jointly. Be as specific as possible.

- *David Noble: Need to validate guidelines/handbook; want to leverage ongoing empirical work*
- *Kathy: Aptima is developing conceptual tool, could work with other tool builders*
- *DCODE plus Ewall*
- *Programs need to articulate this (e.g., how we write BAA, RFP, NRAs should invite collaboration)*
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Confirm the top priority collaboration tools needed in the area to facilitate team collaboration

- *Tools for diagnosing different "world models"*
- *Tools for helping teams set themselves up (e.g., choosing media, business rules like how we make decisions (majority vote, unanimous vote, boss decides, etc.))*
- *Training people on sharing their unique information and how to weight it*
- *Tools for information management (chunking, filtering)*
- *Tools for expressing reliability, pedigree, etc. of information/people*
- *Tools for locating expertise*
- *Tools for disambiguating situation awareness*
- *Tools for sharing information over time (shift handovers to organizational memory)*
- *Fairly mature: visualization tools, highlighting; but some issues in understanding how groups use these, methods and analysis*
- *Tools for managing group process (exit criteria/when to stop, feedback, reentry; e.g., switchback to active thinking)*
- *Tools for tracking progress*

Backup Charts

Establish Conventions

- Cap: Bypass limitations of media, communication bottlenecks; improve speed and efficiency of communication, automated messaging
- David: When do you need different communication media?
- Kathy: Choice of media, meeting structure, etc. is decision by team, partly on personal preference
- Cap: Media richness
- David: Lots of research on different media
- Sara: Curvilinear relationship between frequency of communication and on schedule; not simply an issue of efficiency
- Cap: Fast-paced military situations: bottleneck in transmitting information
- Karen: Information overload, right info at the right time; task

Establish Conventions (2)

- Sara: Information filtering, automate categorization of messages
- David: Setting up business rules (when to cc:, when to interrupt); lots of ad-hoc guidelines
- Patty: Organization provides guidance on conventions too

Shared Understanding

- David: Do we mean facts or interpretations?
- Mike L: Recognizing the situation and agreeing on the facts of the situation such as time available, where resources are located; things fundamental to setting up the problem. Interpretations and goal-setting come later.
- Sara: Contextual assessment.
- Bob: So knowledge elicitation goes in next box, not here. KE is still a big research gap – what is an efficient way to do KE?
- David: Uncertainty representation is part of this; a fact comes with its evidence trail so you know how much to believe it. And filtering for relevance.

Shared Understanding (2)

- Mike L: Group has to know generally about the problem they are working with.
- Cap: In tactical environments, some gaps are source channel reliability, uncertainty about information, tools for choosing action to determine if facts are relevant – diagnostic action prompting
- Mike L: Related issue is how data are delivered – visualization, format; this affects interpretation of situation
- Cap: Representing multi-criteria data, tools to discuss reliability
- David: Another issue is how to find the information – not just database, document, but also social network knowledge

Shared Understanding (3)

- Bob: Expertise locator; how anonymity is used

Develop Collaborative Knowledge

- Cap: Task becomes important here; training on roles and responsibilities
- Sara: Important to understand everyone's perspective (e.g., marketing versus engineering)
- Cap: Goal congruence; public and private agendas
- Sara: OK to have different motivations as long as we want to to the same place; behavior implications are important
- David: Three parts to common understanding: information, values/goals, how does the world work/what to do. Sometimes "what leads to what" is never discussed.

Develop Collaborative Knowledge (2)

- David: “What leads to what”, ways to elicit differences in those is important
- Cap: Cross-training
- Bob: Private agendas are hard to cope with; need to overall goal and criteria
- David: Common understanding and intent; not just the official explicit written document. Also implicit social values. Need to have product quality metrics and progress metrics for team member accountability.

Develop Collaborative Knowledge (3)

- Cap: Some groups are groups of peers; other teams are hierarchical
- Bob: What are stopping rules (e.g., just run out of time?)
- Sara: And when do you have to go back to previous stage?
- Cap: Tools that say you've done enough or tools that say it's time to revisit
- David: People use their judgment about how to use guidance on team-setting etc. Task allocation, organizational structure continue to be research issues

Consensus Attainment

- Bob: What is guidance on good processes for this (e.g., in juries, not good to do ‘straw poll’ first but first encourage discussion); how to generalize across different types of groups
- Sara: What does consensus look like – level of detail; definition of shared; different types of consensus
- David: Consensus isn’t that everyone agrees on decision; but it’s willingness to support the group’s chosen course of action

Consensus Attainment (2)

- Cap: This topic isn't entirely relevant for tactical or hierarchical teams; but there are tools for stakeholder analysis and compromising
- Bob: Consensus and negotiation aren't the same; negotiation implies trading of assets which is different.
- Bob: Everything depends on task!
- Kathy: Lots of research on consensus attainment in the goal-setting literature.
- Cap: Disagreements could be on facts, values, "what leads to what"; maybe tools could help us distinguish between these
- Bob: For example, having people tag information credibility helps diagnose why they disagree

Consensus Attainment (3)

- David: Big research gap is diagnosing differences in world models (‘what leads to what’); this is often implicit

Validation: What does this mean?

- Actually taking action?
- Running experiments to test tools?
- Working out the implementation plan given that we agree on overall course of action?

- Diagnosing the effectiveness of our team process?
- Is this teamwork or taskwork or both?
- The whole box is a gap!

Other Research Gaps

- Taxonomy of team and task types
- How to identify “regularities in nature” given contextual factors?
- Longitudinal analyses of standing groups (most research is on ad-hoc, “one shot” groups)
- How to generalize from specific studies
- People are members of multiple possibly overlapping groups/communities (implies very simple technology tools)